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REPLY TO
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BVY 97-46

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) YAEC 1299P, "Methods for the Analysis of Boiling Water Reactors Transient Critical Power Ratio Analysis RETRAN - TCPYA01," Yankee Atomic Electric Company, March 30, 1982.
(c) EPRI NP-1923, FIBWR, "A Steady State Core Flow Distribution Code for Boiling Water Reactors, Code Verification and Qualification Report," Electric Power Research Institute, July 1981.
(d) EPRI NP-1580, RETRAN, "A Program for One-Dimensional Transient Thermal Hydraulic Analysis of Complex Fluid Flow Systems," Electric Power Research Institute, December 1978.

Subject: Submittal of YAEC-1339, "Yankee Atomic Electric Company Application of FIBWR2 Core Hydraulics Code to BWR Reload Analysis"

Attached for NRC review is YAEC-1339, "Yankee Atomic Electric Company Application of FIBWR2 Core Hydraulics Code to BWR Reload Analysis." Vermont Yankee intends to use FIBWR2, a new version of FIBWR, to validate reload analyses which include new fuel types with part length fuel rods and varied water tube designs. The subject report describes the modifications to the transient Critical Power Ratio (CPR) methods [Reference (b)], which determine the limiting fuel bundle or "hot channel" response to an Abnormal Operational Transient (AOT). The most limiting AOT provides the largest transient CPR response from which the plant's CPR operating limits are determined. Since Vermont Yankee will use a fuel assembly with part length fuel rods in the next operating cycle, Cycle 20, it is our intention to apply this methodology in the Cycle 20 and subsequent reload analyses.

Current Transient CPR Methodology

The present YAEC BWR reload methodology for determination of CPR operating limits is based on the FIBWR and RETRAN thermal hydraulics codes [References (c) and (d)]. This methodology employs a three step process for determining the plant response to an AOT. The initial step determines the steady state thermal hydraulic parameters for the core design for input as initial conditions for RETRAN. The overall plant response to the initiating event of the AOT is then simulated with RETRAN. The reactor core power and thermal hydraulic response of the system model are then applied as boundary conditions to the hot channel RETRAN model. The hot channel response determines the transient CPR via a post processor, TCPYA01, which contains the vendor critical power correlation.

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Use of FIBWR2 for CPR Determination

The FIBWR2 code "hot channel" methodology has been qualified to replace the RETRAN/TCPYA01 method. The qualification, documented in the attached report, has been implemented by:

- comparison to analytic derivations of a flow decay and sinusoidal flow oscillation transients.
- benchmarks to the General Electric ATLAS test facility critical heat flux experiments.
- comparison to the approved YAEC CPR methodology using RETRAN.

Based on the results of this qualification effort, FIBWR2 is an equivalent replacement for the RETRAN/TCPYA01 method.

Steady-State Application of FIBWR2

Vermont Yankee will also use FIBWR2 as the replacement for FIBWR, the existing computer code for the BWR steady-state reload methodology and the foundation of FIBWR2. Vermont Yankee found that FIBWR2 performs identically to the FIBWR code for calculation of steady-state thermal hydraulics. The steady-state qualification of FIBWR2 has been included by reference in the attached report.

Requested Review Schedule

Completion of your review is requested by November 30, 1997. This will allow time to incorporate a reference to the NRC's evaluation of FIBWR2 into the Vermont Yankee Technical Specifications so that FIBWR2 can be used for validating Vermont Yankee's Cycle 20 reload analysis being performed by General Electric. Vermont Yankee will submit an administrative Technical Specification proposed change by May 30, 1997 to incorporate this reference. This will allow a parallel review of this submittal and the subsequent Technical Specification proposed change. In this way reference to the NRC's safety evaluation can be promptly added to the Vermont Yankee Technical Specifications once the NRC's evaluation is complete.

We trust that this submittal provides sufficient information for your review. However, if additional information is required, please contact this office.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

James J. Duffy

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c: USNRC Region 1 Administrator
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